AMENDMENTS TO THE DRAWINGS

Submitted herewith are corrected drawings labeled "Replacement Sheet" in which FIGS. 4A, 5A, 4B, and 5B are designated by the legend "Prior Art". No new matter has been included. In addition, submitted herewith is a corrected drawing labeled "Replacement Sheet" in which FIG 1A is corrected to show an open groove 17A as groove 17A is depicted in FIGS. 2A and 3A as filed. No new matter has been added.

REMARKS

Objection to the Specification

The specification has been objected to for the following reasons:

Figures 2B through 5B should be Figures 2B, 3B, 4B and 5B. This correction has been made.

Objection to the Drawings

The drawings have been objected to for the following reasons:

Figures 4A, 4B, 5A and 5B should be designated by a legend such as –Prior Art--. Corrected drawings have been submitted herewith.

35 U.S.C. §112, second paragraph

Claim 7 is rejected under 35 U.S.C. § 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. Claim 7 is amended herein to depend from claim 4, whereby eliminating any lack of antecedent basis.

Stumpf

Claims 1-5 and 9-10 are rejected under 35 U.S.C. 102(b) as being anticipated by Stumpf (AT 403 358). This rejection is respectfully traversed for the following reasons.

The subject invention is directed to a tread configuration for modulating circumferential groove resonance frequency in a tire. The consequence sought and attained by the claimed invention is to reduce the level of noise that would otherwise be created from a non-modulated circumferential groove. As explained in the specification, as a tire rotates, noise generated at the edges of the tire's footprint or contact patch transmits through the hollow circumferential groove void and is acted on by the pitched tire groove network. Pursuant to the invention, by blocking off lateral grooves based on pitch size, the groove network changes as the tire rotates and tonality is reduced and the peak frequencies are flattened such that the tire noise is improved.

The 360 degree tread of a tire configured pursuant to the invention comprises a series of footprint regions that sequentially close off the circumferential groove as the tire rotates. Each footprint is configured to provide a respective pitch sequence that is differentiated by pitch size and the number of lateral grooves within each pitch that are open to or blocked

from the circumferential groove. To modulate the resonance frequency of the circumferential groove to an optimal extent, the invention combines at least one footprint comprised of pitches having either all open or all closed lateral grooves, and at least one other footprint comprising a plurality of pitches in which open and closed lateral grooves are intermixed. Thus, pursuant to the invention, in addition to the footprints having more or fewer closed and/or open lateral grooves, at least one footprint in the sequential series of footprints is configured in which all of the lateral grooves within the footprint are open or closed. Mixing footprints that have open and closed lateral grooves with at least one footprint that has either all open or all closed lateral grooves results in a modulation of the circumferential groove to an optimum extent.

A reproduction of FIGS. 2B and 3B of the specification is attached with markings depicting exemplary footprints that are disposed at respective locations along the tread circumference. In attached FIG. 3B, the footprint designated "A" shows a pitch sequence in which all lateral grooves are blocked. Footprints designated "B", "C" , and "D" show other footprints comprising a mixing of open and blocked lateral grooves. In attached FIG. 2B, the footprint designated "E" shows a pitch sequence in which all lateral grooves are open. Footprints designated "F", "G", and "H" show other footprints comprising a mixing of open and blocked lateral grooves. It will be appreciated that, as the tread sequentially engages a surface, the footprints A, B, C, D (in tread of FIG. 3B) and E, F, G, H (in tread of FIG. 2B) will at respective times enclose the circumferential groove of the tread. The combined effect of differentiated lateral groove configurations within such footprints will effect an efficient and optimum attenuation of the resonant frequency of the lateral groove throughout each revolution.

The Examiner has collected cited various prior art references that are directed to the concept of tread pitch sequencing for the purpose noise reduction in a tire. As set forth in the specification in the Background to the Invention, Applicant does not dispute that the general concept of pitch sequencing is an established industry practice. However, none of the cited references is direct to the stated objective of the invention; that is, to modulate the resonant frequency of, and therefore the noise generated by, the hollow circumferential groove at the edges of tire's footprint or contact patch. In each of the cited references, a tread is disclosed having a sequence of footprints in which some of the footprints have more or fewer closed and/or open lateral grooves, but no footprints interspersed that have either all open or all closed lateral grooves. The extent of frequency modulation of the circumferential groove

achieved by the prior art is, accordingly, limited and less than optimal.

With specific regard to the Stumpf reference, the pitch sequence therein comprises a series of contact patches, no one of which having either all open or all blocked lateral grooves. Stumpf, therefore, does not meet the limitations of claims 1-10 as amended, and suffers as a result diminished utility in effecting an attenuation of the circumferential groove of the tread. Stumpf, within the context of a ground contacting patch, comprises a sequence of blocks in which at least one lateral groove is open and one lateral groove is blind. In no ground contacting patch or footprint are all the lateral grooves either open or closed. Such a distinction creates a substantial difference when an increased non-uniformity in sequence results in a substantially enhanced modulation of peak frequencies generated by the tire. Stumpf does not specifically delineate the 360 degree tread into a boundaried sequence of footprints; however, it is clear from the disclosure of Stumpf that the footprint would be defined within a rotation of the Stumpf tread that would create entire blocked or entire open lateral grooves within that footprint.

Claims 1-7 and 9-10 are rejected under 35 U.S.C. 103(a) as being unpatentable over Stumpf in view of Hoffmeister (US 5,769,990) and Wesolowski (US 5,753,057). This rejection is respectfully traversed at least for the reasons set forth above for the Stumpf reference, and for the following additional reasons. The Examiner relies on the addition of Hoffmeister and Wesolowski as showing four different pitches. However, there is no teaching in either of such references on the benefit to be gained in configuring at least one of the footprints within a tread to have either all open or all blind lateral grooves. The general pitch sequencing principles presented in both Hoffmeister and Weslowski are directed to minimizing the noise resulting from tread elements through the selective pitch sequencing of such elements. Nowhere does either reference address means for attenuating the resonance of the circumferential groove. Likewise, neither reference teaches a footprint series in which at least one footprint comprises a plurality of pitches having either all open or all closed lateral grooves, and at least one other footprint comprising a plurality of pitches in which open and closed lateral grooves are intermixed.

Claim 8 is rejected under 35 U.S.C. 103(a) as being unpatentable over Stumpf in view of Hoffmeister and Wesoloski as applied above and further in view of German 061 (DE 10145061). This rejection is respectfully traversed at least for the reasons set forth above and for the following additional reasons. The addition of German 061 reference does not mitigate the insufficiency of the three other references discussed previously. Moreover, there is no

teaching or suggestion in any of the four cited references that would instruct one skilled in the art toward the selective combination in the manner promoted by the Examiner to be obvious. In fact, the German 061 reference likewise fails to address means for attenuation of a hollow tube formed by a footprint enclosing a circumferential groove. The German 061 reference does not, therefore, teach a series of footprint regions that sequentially enclose a circumferential groove wherein at least one footprint region is comprised of a plurality of pitches having either all open or all closed lateral grooves, and at least one other footprint comprising a plurality of pitches in which open and closed lateral grooves are intermixed.

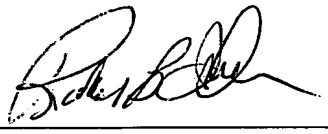
Japan 610

Claims 1-3 and 9-10 have been rejected under 35 U.S.C. 102(b) as being anticipated by Japan 610 (JP 4-201610). This rejection is respectfully traversed for at least the reasons set forth above and for the following additional reasons. Japan '610 in FIG. 1 shows blocked lateral grooves and open grooves in a sequential pattern that clearly would be intermixed within any footprint of the tread throughout a 360 degree revolution. As such, the reference does not anticipate the claimed invention that specifies at least one footprint region comprised of a plurality of pitches having either all open or all closed lateral grooves, and at least one other footprint comprising a plurality of pitches in which open and closed lateral grooves are intermixed. There is further no teaching or suggestion in Japan'610 with which to instruct one skilled in the art toward such a tread configuration. Consequently, the rejection of claims 1-3 and 9-10 as anticipated by the reference is believed to be improper.

Claims 4-7 are rejected under 35 U.S.C. 103(a) as being unpatentable over Japan 610 in view of Wesolowski. This rejection is respectfully traversed for the following reasons. As discussed previously, Wesolowski does not teach a tread pattern that comprises a series of footprints wherein at least one footprint is comprised of a plurality of pitches having either all open or all closed lateral grooves, and at least one other footprint comprising a plurality of pitches in which open and closed lateral grooves are intermixed. There is further no teaching or suggestion in Wesolowski with which to instruct one skilled in the art toward such a tread configuration. Consequently, combining Wesolowski with Japan '610 does not result in the claimed invention and would result in a tread configuration producing less than optimal frequency attenuation of a circumferential groove.

In light of this amendment, all of the claims now pending in the subject patent application are allowable. Thus, the Examiner is respectfully requested to allow all pending claims.

Respectfully submitted,



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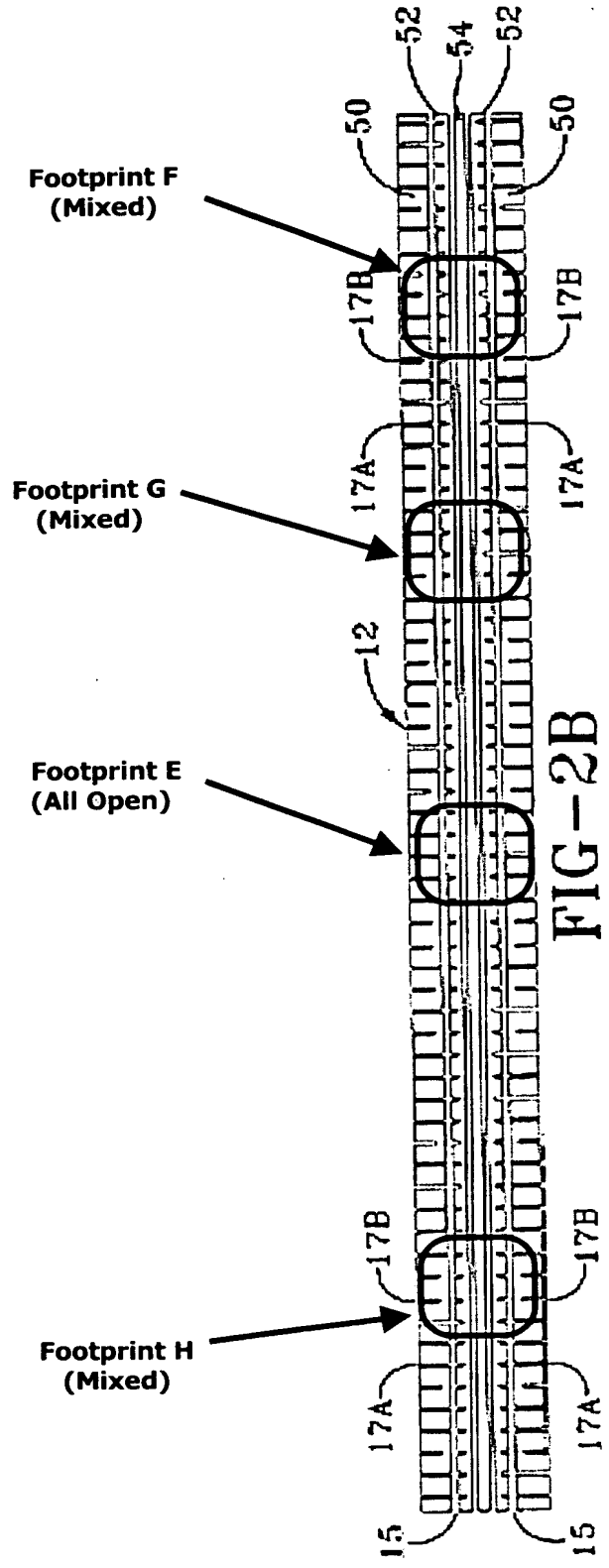

FIG-2B

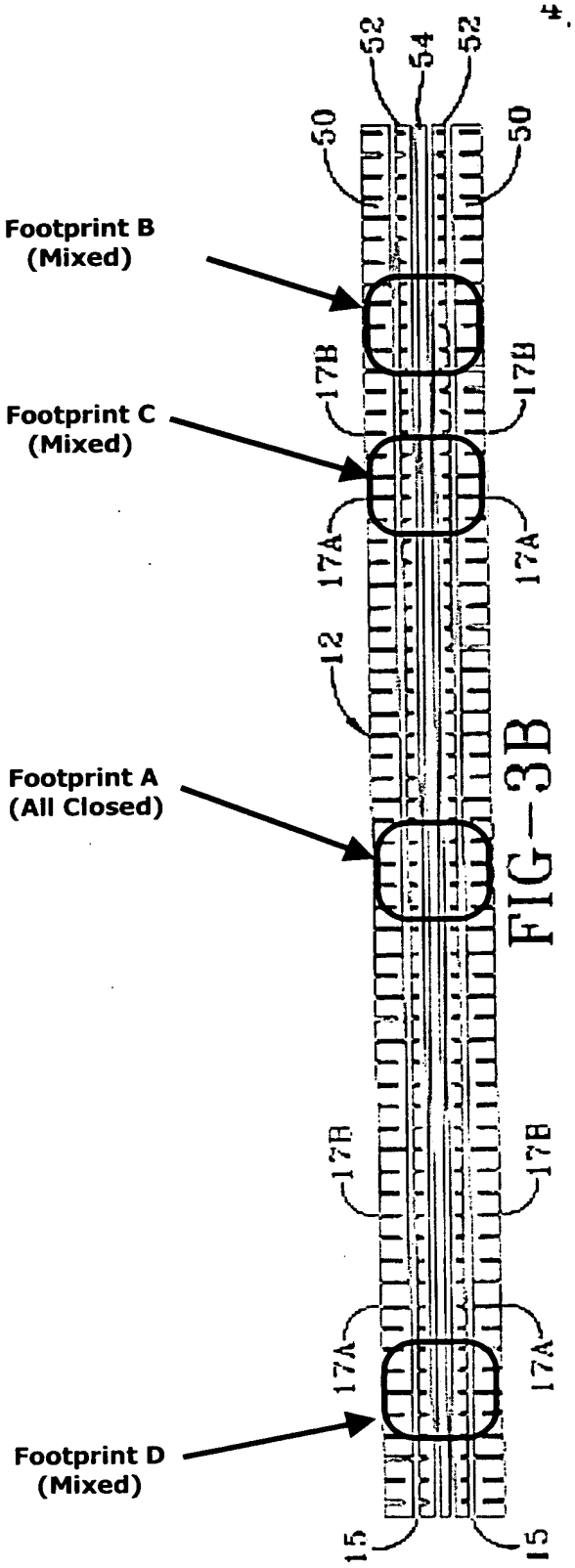

FIG-3B